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Attorney Docket No. ATI-192

15/12/01
Brief
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES

Re: Application of: David S. BREED
Serial No.: 09/114,962
Filed: July 14, 1998
For: Self-Contained Airbag System
Examiner: E. Culbreth
Art Unit: 3611

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APPEAL BRIEF UNDER 37 C.F.R. §1.192(a)

Assistant Commissioner for Patents
Washington, D.C. 20231

March 14, 2001

Sir:

On January 12, 2001, appellant, through his attorney, appealed from the final rejections of claims 1-7, 9-14, 16-19, 21-24 and 26-31 set forth in an Office Action mailed by the U.S. Patent and Trademark Office on October 12, 2000 for the above-identified application.

This Appeal Brief is submitted in triplicate by the appellant, through his attorney, in support of the patentability of claims 1-7, 9-14, 16-19, 21-24 and 26-31 of this application. For the reasons set forth below, it is believed that the rejections in the Office Action dated October 12, 2000 should be reversed.

A. REAL PARTY IN INTEREST

The real party in interest of the above-identified application is Automotive Technologies International, Inc. by virtue of an assignment of 100% interest in the application by the inventor-appellant.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to "Assistant Commissioner for Patents, Washington, D.C. 20231" on March 14, 2001.

Brian Roffe, Esq.

By: 

B. RELATED APPEALS AND INTERFERENCES

At this time, there are no related appeals or interferences.

C. STATUS OF CLAIMS

Claims 1-31 are pending in this application and claims 1-7, 9-14, 16-19, 21-24 and 26-31 are rejected. Claim 8, 15, 20 and 25 are objected to as being dependent on a rejected base claim, but would be allowable if rewritten in independent form. Appellant is therefore appealing the final rejections of claims 1-7, 9-14, 16-19, 21-24 and 26-31.

Claim 1 is an independent claim upon which rejected claims 2-7, 9-15, 30 and 31 depend directly or indirectly, claim 16 is a second independent claim upon which rejected claims 17-19 and 21 depend directly or indirectly, claim 22 is a third independent claim upon which rejected claims 23, 24, 26 and 27 depend and claim 28 is a fourth independent claim upon which rejected claim 29 depends.

The text of the claims on appeal is found in Appendix 1.

D. STATUS OF AMENDMENTS FILED SUBSEQUENT TO THE FINAL REJECTION

After the final Office Action mailed on October 12, 2000, a first Amendment Under 37 C.F.R. §1.116 was filed on December 14, 2000. In an Advisory Action mailed January 2, 2001, the Examiner indicated that this first Amendment would not be entered because changes to the claims raised new issues that would require further consideration and/or search. A second Amendment Under 37 C.F.R. §1.116 was filed on January 12, 2001. In an Advisory Action mailed January 19, 2001, the Examiner indicated that this second Amendment would not be entered because changes to the claims raised new issues that would require further consideration and/or search. A third Amendment Under 37 C.F.R. §1.116 was filed on February 1, 2001. In an Advisory Action mailed February 13, 2001, the Examiner indicated that this third Amendment would be entered.

A Notice of Appeal was filed January 12, 2001.

E. SUMMARY OF THE INVENTION

The invention relates to airbag safety restraint systems for a vehicle that are self-contained. That is, the airbag system includes a crash sensor having a sensor housing in which a sensing mass is situated and whose motion over time is used to control ignition of a gas-generating material for inflating an associated airbag.

More particularly and with reference to the non-limiting embodiment shown in Figs. 9-11A, claims 1-7, 9-14 and 28-31 are directed to a vehicle including a side impact airbag system 950 comprising a system housing 970 (and other un-illustrated or un-designated elements) arranged on a side of the vehicle alongside at least a portion of the passenger compartment (see Fig. 16) and defining an interior space, at least one inflatable airbag (not shown in Figs. 9-11A) arranged in the interior space, inflator means arranged at least partially within the interior space for inflating the airbag(s) and including an inflator housing containing propellant, and a crash sensor for initiating inflation of the airbag(s) via the inflator means upon a determination of a crash requiring inflation thereof.

The crash sensor comprises a sensor housing 901 "arranged within said system housing", the system housing being arranged on the side of the vehicle, and a sensing mass 941 arranged in the sensor housing 901 to move relative to the sensor housing 901 in response to acceleration of the sensor housing 901 resulting from a crash into the side of the vehicle (as set forth in independent claim 1). Upon movement of the sensing mass 941 in excess of a threshold value, the crash sensor initiates the inflator means to inflate the airbag. This embodiment is shown schematically in Fig. 1 of Appendix 2.

In the embodiments of the invention set forth in claims 28 and 29, the crash sensor comprises a sensor housing arranged proximate to the inflator housing (either within the system housing or exterior thereof), and a sensing mass arranged in the sensor housing to move relative to the sensor housing in response to acceleration of the sensor housing resulting from a crash into the side of the vehicle (as set forth in independent claim 28). Upon movement of the sensing mass in excess of a threshold value, the crash sensor initiates the inflator means to inflate the airbag. This embodiment is shown schematically in Fig. 2 of Appendix 2.

Claims 16-19, 21-24, 26 and 27 are directed to an airbag safety restraint system for a vehicle comprising an inflatable airbag having an interior and an inflator assembly having an inflator housing containing an ignitable gas generating material and at least one passage extending between the gas generating material and the interior of the airbag. Upon ignition of the gas generating material, gas is generated and flows through the passage(s) into the interior of the airbag to inflate the airbag. An electronic crash sensor causes ignition of the gas generating material upon a determination of a crash requiring inflation of the airbag. For example, Fig. 14 shows an airbag system with an electronic sensor 1401.

In these embodiments, the crash sensor comprises a sensor housing "situated exterior of said inflator housing", i.e., the crash sensor is not arranged in the inflator housing. By providing separate immediate housings of the crash sensor and inflator, a problem in certain prior art systems wherein the

sensor is placed inside of the inflator is overcome, this problem arises because in such systems, the strength requirements of the inflator walls increase and thus the size and weight of the system increase (as discussed in the specification at page 1, lines 28-30). This embodiment of the invention is shown schematically in Fig. 3 of Appendix 2.

In the embodiments of the invention set forth in claims 16-19 and 21, the crash sensor further comprises a sensing mass arranged in the sensor housing to move relative to the sensor housing in response to accelerations of the sensor housing resulting from a crash, and a micro-processor comprising an algorithm for determining whether the movement of the sensing mass over time results in a calculated value which is in excess of a threshold value. If so, the micro-processor causes ignition of gas generating material and thus inflation of the airbag.

In the embodiments of the invention set forth in claims 22-24 and 26, the crash sensor further comprises an accelerometer arranged in the sensor housing and including a sensing mass movable relative to the sensor housing in response to accelerations of the sensor housing resulting from a crash. The accelerometer generates a signal representative of the movement of the sensing mass over time. The crash sensor causes ignition of the gas generating material if the movement over time of the sensing mass represented by the signal results in a calculated value in excess of a threshold value.

F. ISSUES ON APPEAL

The issues presented on this appeal are as follows:

1. Whether it would have been obvious or even possible for a person having ordinary skill in the art at the time the invention was made to combine purported teachings of Breed with the system of Haviland and thereby arrive at the embodiments of the invention set forth in claims 1, 6, 10, 12, 28 and 29.
2. Whether it would have been obvious or even possible for a person having ordinary skill in the art at the time the invention was made to include the electronic sensor of Merhar in the system of Breed and mount the modified Breed system alongside a passenger compartment in view of Haviland and thereby arrive at the embodiments of the invention set forth in claims 2-4, 14 and 30.
3. Whether it would have been obvious or even possible for a person having ordinary skill in the art at the time the invention was made to include a microprocessor in the sensor housing as shown in Spies et al. in the Breed sensor and mount the modified Breed system alongside a passenger compartment in view of Haviland and thereby arrive at the embodiments of the invention set forth in claims 5, 7, 9 and 11.
4. Whether it would have been obvious or even possible for a person having ordinary skill in the art at the time the invention was made to include a microprocessor in the sensor housing as shown in

Spies et al. in the Breed sensor and thereby arrive at the embodiments of the invention set forth in claims 16-19, 21-24, 26 and 27.

5. Whether it would have been obvious or even possible for a person having ordinary skill in the art at the time the invention was made to modify the Breed sensor to have the sensor housing outside of the inflator housing and mount the modified Breed system alongside a passenger compartment in view of Haviland and thereby arrive at the embodiment of the invention set forth in claim 31.

6. Whether it would have been obvious or even possible for a person having ordinary skill in the art at the time the invention was made to mount the sensor of Breed on a fixed part of the vehicle in view of Lau et al. and alongside a passenger compartment in view of Haviland and thereby arrive at the embodiment of the invention set forth in claim 13.

G. GROUPING OF CLAIMS

Claims 1-7, 9-14, 16-19, 21-24 and 26-31 do not stand or fall together. Rather, claims 1, 6, 10, 12, 28 and 29 stand or fall together (a first group), claims 2-4, 14 and 30 stand or fall together (a second group), claims 5, 7 and 11 stand or fall together (a third group), claims 16-19, 22-24 and 27 stand or fall together (a fourth group), claims 21 and 26 stand or fall together (a fifth group) and claims 9, 13 and 31 each stand alone. It is believed that claims 1, 6, 10, 12, 28 and 29 are separately patentable, claims 2-4, 14 and 30 are separately patentable, claims 5, 7 and 11 are separately patentable, claims 16-19, 22-24 and 27 are separately patentable, claims 21 and 26 are separately patentable and claims 9, 13 and 31 are each separately patentable.

H. ARGUMENT

1. The Rejections

Claims 1, 6, 10, 12, 28 and 29 are rejected under 35 U.S.C. §103(a) as being unpatentable over Haviland (U.S. Pat. No. 3,791,667) in view of Breed (U.S. Pat. No. 4,666,182).

Claims 2-4, 14 and 30 are rejected under 35 U.S.C. §103(a) as being unpatentable over Breed in view of Haviland and Merhar (U.S. Pat. No. 3,701,903).

Claims 5, 7, 9 and 11 are rejected under 35 U.S.C. §103(a) as being unpatentable over Breed in view of Haviland and Spies et al. (U.S. Pat. No. 6,015,162).

Claims 16-19, 21-24, 26 and 27 are rejected under 35 U.S.C. §103(a) as being unpatentable over Breed in view of Spies et al.

Claim 31 is rejected under 35 U.S.C. §103(a) as being unpatentable over Haviland in view of Breed and Spies et al.

Claim 13 is rejected under 35 U.S.C. §103(a) as being unpatentable over Haviland in view of Breed and Lau et al. (U.S. Pat. No. 5,273,309).

2. Applicable Law

The basis of a rejection under 35 U.S.C. §103(a) is that it would have been obvious to one skilled in the art at the time the invention was made to combine one reference (or a specific feature in that reference) with another reference and arrive at the applicant's invention. In rejecting claims under 35 U.S.C. §103, the Examiner bears the initial burden of presenting a *prima facie* case of obviousness. *In re Oetiker*, 977 F.2d 1443,1445, 24 USPQ2d 1443,1444 (Fed. Cir. 1995). A *prima facie* case of obviousness is established when the teachings from the prior art itself would appear to have suggested the claimed subject matter to a person of ordinary skill in the art, *In re Rickaert*, 9 F.3d 1531 (Fed. Cir. 1993).

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion or motivation to do so found within the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). If the proposed modification would render the prior art invention unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

3. Prior Art

Breed

Breed is directed to a non-crush zone, all-mechanical damped sensor. As background of the invention, Breed discusses differences between sensors mounted in the crush zone of the vehicle, i.e., that portion of the vehicle which will crush in an impact, and non-crush zone sensors, i.e., sensors which are not located in the crush zone of the vehicle (see col. 1, lines 6-46). A crush-zone sensor has significantly different design and operational criteria than a non-crush zone sensor. For example, there are significant differences in the manner in which the sensors are triggered by a velocity change and the amount of energy required to actuate a release mechanism.

The sensor of Breed is specifically designated for use solely outside of the crush zone (col. 1, lines 63-68, col. 2, lines 39-41). Its construction is purportedly unique and solves the problem of locating a damped sensor outside of the frontal crush zone of a vehicle.

Haviland

Haviland shows a cushioning system for a vehicle including housings 32, some of which are recessed in the doors 20,22. Housings 32 include a stretchable membrane which is expanded by ducting fluid under pressure into the housings 32 through fittings 42. Ducting of the fluid occurs upon actuation of an inertia or impact-actuated control mechanism (col. 2, lines 60-66).

Merhar

Merhar shows a crash sensor mounted in the crush zone of a vehicle 41 so that a crystal 10 in the crash sensor is compressed between mass 43 and the vehicle 41 in response to a crash. Compression of the crystal 10 appears to be essential for the use of the Merhar crash sensor and thus the crash sensor must be placed in a position subject to crushing during a crash, e.g., in the crush zone.

Spies et al.

Spies et al. shows a restraint system with two separate closed housings that facilitate storage, assembly and environmentally safe disposal. The first housing includes solid fuel tablets and the second housing includes a sensor, a triggering element and ignition structure (see the Abstract). It is alleged that in the prior art, the igniter/primer is structurally integrated with the gas generator housing resulting in electrical and chemical problems (see col. 1, lines 45-62). Thus, Spies et al. provides a solution to these problems by having the two housing which are in non-use, separated from one another and thus cannot come into contact with each others fillings other than at will (col. 2, lines 15-21).

Lau et al.

Lau et al. shows an air bag assembly for side impact protection in which the inflator and air bag(s) are stored in the vehicle pillar adjacent the front seat back.

4. Argument

Issue 1

It would not have been obvious or even possible for a person having ordinary skill in the art at the time the invention was made to combine purported teachings of Breed with the system of Haviland because Breed teaches away from the proposed modification.

The Examiner takes the position that it would have been obvious to modify Haviland to include an airbag system such as taught by Breed along its sides. However, if a proposed modification would render a

prior art invention unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification and obviousness cannot be established. See, *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

The Examiner's position is thus respectfully traversed on the grounds that the sensor of Breed is indisputably designed and intended for use as a non-crush zone sensor whereas the sides of the vehicle alongside the passenger compartment are invariably in a crush zone of the vehicle. The proposed modification would result in placement of the Breed sensor in a crush zone and thus render the Breed sensor unsatisfactory for its intended purpose, in which case, there is no suggestion or motivation to make the proposed modification. *Ibid.*

Breed emphasizes that the construction of the sensor thereof is unique in order to enable its use outside the frontal crush zone of the vehicle. Haviland includes housings for stretchable membranes 52 recessed in the doors 20,22 of the vehicle. The doors of the vehicle are in a crush zone of the vehicle as they will invariably be crushed upon impact of an object into the side of the vehicle.

Since the essence of the novelty of the Breed sensor lies in its unique construction to enable it to function outside of the crush zone, Breed teaches away from the placement of the sensor thereof in a crush zone of a vehicle, such as in the doors of Haviland.

Furthermore, the sensor of Breed is intentionally designed to require very little energy to actuate the release mechanism. This is consistent with the placement of the sensor outside of the crush zone, i.e., in the crush zone, sensors are designed to actuate upon a relatively large energy force. Placement of the sensor of Breed in a crush zone would thereby result in the sensor being overly sensitive as it would be actuated upon minor contacts and thus would be unsatisfactory for its intended purpose.

In view of the specific design of the sensor of Breed as a non-crush zone sensor, placement of the sensor in the crush zone would render it unsatisfactory for its intended purpose, i.e., discriminating between major crashes warranting deployment of an occupant restraint and minor crashes which do not warrant deployment of the occupant restraint. As such, there is no suggestion or motivation to place the sensor of Breed in a crush zone of a vehicle, e.g., in a door of a vehicle as in the Examiner's proposed combination of Breed and Haviland.

The Examiner stated in the Advisory Action dated January 19, 2001 that Breed teaches away from frontal crush zone sensors and that Haviland would have in the combination, the airbags and sensors in positions away from the front crush zone. However, Breed in essence teaches away from placement of the sensor in any crush zone of the vehicle, including, e.g., the crush zones on the sides of the vehicle. Thus, in

the Examiner's proposed modification of Haviland the sensors of Breed would not be in the front crush zone but would be in the side crush zone, which deviates from the teachings of Breed.

Moreover, the absence in the claims of the recitation of the sensor being in the crush zone, as noted by the Examiner in the Advisory Action dated January 2, 2001, is of no import because the arguments above are directed to the proposed combination of references applied by the Examiner. That is, the position of a sensor vis-à-vis the crush zones of the vehicle is an important aspect one skilled in the art would consider and after such consideration, it is respectfully submitted that one would not be motivated to place the sensor of Breed in the system of Haviland in view of the design of the sensor of Breed for mounting outside of a crush zone and the placement of the airbag system of Haviland in the side crush zone .

In view of the arguments presented above, it is respectfully submitted that it would not be obvious to one of ordinary skill in the art to modify the system of Haviland to include an airbag system as in Breed. The sensor of Breed is simply inappropriate for placement along the sides of the vehicle and thus in a crush zone of the vehicle in side impacts.

In view of the foregoing, it is respectfully submitted that claims 1, 6, 10, 12, 28 and 29 are not render unpatentable by Haviland in combination with Breed.

Issue 2

It would not have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breed to include a system mounted alongside the passenger compartment as purportedly taught by Haviland and an electronic sensor as purportedly taught by Merhar in view of a significant difference between the position of the crash sensor of Breed and the crash sensor of Merhar.

The crash sensor of Breed, the sensor-initiator 10, is intentionally designed to be mounted entirely outside of the crush zone of the vehicle (col. 2, lines 39-41). By contrast, the crash sensor of Merhar is mounted in the crush zone so that the crystal 10 is compressed between the mass 43 and the vehicle 41 in response to a crash. Mounting the crystal 10 outside of the crush zone as in Breed would not result in a compressive force being applied to the crystal and thus would negate the entire operability of the crash sensor of Merhar.

Since the crash sensor of Merhar is not designed to be mounted in the same type of location as the crash sensor of Breed, one skilled in the art would not be motivated to substitute the crash sensor of Merhar for the crash sensor of Breed or include the crash sensor of Merhar in the Breed system. Indeed, the proposed modification would render the Merhar electronic sensor unsatisfactory for its intended purpose, in which case, there is no suggestion or motivation to make the proposed modification.

Moreover, claims 2-4, 14 and 30 include all of the limitations of claim 1. Merhar does not overcome the deficiencies of the combination of Breed and Haviland discussed above, and therefore, one could not combine Breed, Haviland and Merhar and arrive at the embodiments of the inventions set forth in claims 2-4, 14 and 30.

Accordingly, it is respectfully submitted that the Examiner's proposed combination of Breed, Haviland and Merhar is untenable and that the rejection of claims 2-4, 14 and 30 under 35 U.S.C. §103(a) in view of this combination has been overcome and should be removed.

Issue 3

There is no teaching or suggestion provided by Breed, Haviland or Spies et al. supporting the proposed combination of references to render claims 5, 7, 9 and 11 unpatentable, and therefore the combination can only be made with the use of hindsight reconstruction, which is impermissible.

Spies et al. does not overcome the deficiencies of the combination of Breed and Haviland discussed above, and therefore, one could not combine Breed, Haviland and Spies et al. and arrive at the embodiments of the invention set forth in claims 5, 7, 9 and 11.

Moreover, with respect to claim 9, the embodiment set forth in this claim is separately patentable because the claim recites that the inflator means comprise a primer arranged in the inflator housing (with the propellant) and forming part of an electronic circuit. In Spies et al., the primer is not arranged in the same housing as the propellant. Rather, it is an explicit objective and requirement of the Spies et al. system to separate a housing containing the solid fuel from a housing containing the ignition means (see col. 2, lines 7-21). This is achieved by providing a first closed housing 1 including the ignition means and primer 4 and a second housing 7 including the tablets of solid fuel 10.

In contrast to Spies et al., in the embodiment set forth in claim 9, the primer is arranged in the same housing as the propellant, whereby the electronic sensor is arranged in a separate sensor housing. Spies et al. clearly teaches away from this construction.

In view of the foregoing, it is respectfully submitted that the embodiments of the invention set forth in claims 5, 7, 9 and 11 are not taught or suggested by Breed, Haviland and Spies et al., in combination, and further that one skilled in the art could not, and in any event would not be motivated to, combine Spies et al., Breed and Haviland and arrive at the embodiments of the invention set forth in claims 5, 7, 9 and 11.

Accordingly, it is respectfully submitted that the Examiner's proposed combination of Breed, Haviland and Spies et al. is untenable and that the rejection of claims 5, 7, 9 and 11 under 35 U.S.C. §103(a) in view of this combination has been overcome and should be removed.

Issue 4

It would not have been obvious to one of ordinary skill in the art at the time the invention was made to combine the sensor of Spies et al. with the airbag safety restraint system of Breed in view of a particularly (and allegedly) novel feature of the Spies et al. sensor which would be rendered meaningless if used in the Breed system.

Spies et al. notes that in the prior art, the igniter/primer is structurally integrated with the gas generator housing resulting in electrical and chemical problems and provides a solution to these problems by having the two housing separated from one another when not in use so that they cannot come into contact with each others fillings, other than when desired.

In Breed, the sensor housing is inside the inflator housing. As a result of this positioning, there is a significant possibility of the firing pin 66 impacting the primer 36 resulting in unintentional inflation of the airbag.

In view of the explicit objective in Spies et al. to provide the sensor housing separate from the inflator housing and the presence of the sensor housing within the inflator housing in Breed, one skilled in the art would not be motivated to substitute the sensor housing (and sensor) of Spies et al. for the sensor in Breed. Indeed, the sensor of Spies et al. is incompatible with and not a viable substitute for the sensor of Breed because the sensor of Breed, i.e., sensor-initiator 10, is inside the inflator 12, in which case, the problems which Spies et al. is directed to solving would arise thereby frustrating the objective of the Spies et al. invention.

Furthermore, with respect to claims 21 and 26, the embodiments of these claims are separately patentable because in Spies et al., the primer is not arranged in the same housing as the gas generating material that causes inflation of the airbag. Rather, it is an important feature of the Spies et al. system to separate a housing containing the solid fuel from a housing containing the ignition means (see col. 2, lines 7-21).

In view of the foregoing, it is respectfully submitted that claims 16-19, 21-24, 26 and 27 are not taught or suggested by Breed and Spies et al., in combination, and further that one skilled in the art could not, and in any event would not be motivated to, combine Spies et al. and Breed and arrive at the embodiments of the invention set forth in these claims.

Accordingly, it is respectfully submitted that the Examiner's proposed combination of Breed and Spies et al. is untenable and that the rejection of claims 16-19, 21-24, 26 and 27 under 35 U.S.C. §103(a) in view of this combination has been overcome and should be removed.

Issue 5

It would not have been obvious to one of ordinary skill in the art at the time the invention was made to modify the sensor of Breed, in the system of Haviland, to provide a sensor housing outside of the inflator housing in view of Spies et al.

As noted above, Spies et al. shows a restraint system with two separate, closed housings that facilitate storage, assembly and environmentally safe disposal. In the Haviland system combined with the Breed sensor, the sensor housing (of Breed) would be arranged inside the inflator housing so that there is a significant possibility of the firing pin 66 impacting the primer 36 resulting in unintentional inflation of the airbag.

The relative positioning of the sensor housing and inflator housing in Spies et al. and Breed thus conflict with one another, i.e., in Spies et al., the sensor housing is separate from the inflator housing whereas in Breed, the sensor housing is within the inflator housing in Breed. In view of this conflict, and the express goal of Spies et al. to maintain the sensor housing separate from the inflator housing, one skilled in the art would not be motivated to substitute the sensor housing (and sensor) of Spies et al. for the sensor of Breed in the Haviland system.

In view of the foregoing, it is respectfully submitted that the embodiment of claim 31 is not taught or suggested by Breed, Haviland and Spies et al., in combination, and further that one skilled in the art could not, and in any event would not be motivated to, combine Spies et al., Haviland and Breed and arrive at the embodiment of the invention set forth in claim 31.

Accordingly, it is respectfully submitted that the Examiner's proposed combination of Breed, Haviland and Spies et al. is untenable and that the rejection of claim 31 under 35 U.S.C. §103(a) in view of this combination has been overcome and should be removed.

Issue 6

It would not have been obvious to one of ordinary skill in the art at the time the invention was made to modify the sensor of Breed, in the system of Haviland, to mount the sensor on a fixed part of the side of the vehicle in view of Lau et al.

Lau et al. does not disclose a self-contained airbag system including a crash sensor housing situated within the same system housing as an airbag and inflator therefor, and which crash sensor housing contains a sensing mass operative to detect a crash into the side of the vehicle requiring air bag deployment, and therefore does not overcome the deficiencies of the combination of Haviland and Breed.



In view of the foregoing, it is respectfully submitted that the embodiment of claim 13 is not taught or suggested by Breed, Haviland and Lau et al., in combination, and further that one skilled in the art could not, and in any event would not be motivated to, combine Lau et al., Haviland and Breed and arrive at the embodiment of the invention set forth in claim 13.

Accordingly, it is respectfully submitted that the Examiner's proposed combination of Breed, Haviland and Lau et al. is untenable and that the rejection of claim 13 under 35 U.S.C. §103(a) in view of this combination has been overcome and should be removed.

I. CONCLUSION

None of the prior art references cited by the Examiner disclose all of the features of any of the pending claims and one of ordinary skill in the art would not have been motivated at the time the invention was made to modify the references as suggested by the Examiner in view of the lack of any teaching or suggestion supporting the modifications. Further, in some case, the prior art applied in the rejections of the claims teaches away from the proposed combination because important and essential features of the prior art references would be nullified in the proposed combinations.

Therefore, upon reason and authority, it is respectfully requested that the Board reverse all of the final rejections.

The fee of \$155.00 to cover the Official Fee for Filing a Brief in Support of Appeal should be charged to Deposit Account No. 50-0266.

Respectfully submitted,

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APPENDIX 1

1. A vehicle including a side impact airbag system, front wheels, rear wheels and a frame defining a front of the vehicle, a rear of the vehicle and first and second sides of the vehicle,

said airbag system comprising:

a system housing arranged on the first side of the vehicle alongside at least a portion of a passenger compartment of the vehicle, said system housing defining an interior space,

at least one inflatable airbag arranged in said interior space of said system housing such that when inflating, said at least one airbag is expelled from said system housing into the passenger compartment,

inflator means arranged at least partially within said interior space of said system housing for inflating said at least one airbag, said inflator means comprising an inflator housing containing propellant, and

a crash sensor for initiating inflation of said at least one airbag via said inflator means upon a determination of a crash requiring inflation of said at least one airbag,

said crash sensor comprising

a sensor housing arranged within said system housing, and

a sensing mass arranged in said sensor housing to move relative to said sensor housing in response to accelerations of said sensor housing resulting from the crash into the first side of the vehicle such that upon movement of said sensing mass in excess of a threshold value, said crash sensor initiates said inflator means to inflate said at least one airbag.

2. The vehicle of claim 1, wherein said crash sensor is an electronic sensor and the movement of said sensing mass is monitored.

3. The vehicle of claim 2, wherein said electronic sensor further comprises generating means coupled to said sensing mass for generating a signal representative of the movement of said sensing mass.

4. The vehicle of claim 3, wherein said signal is monitored and recorded over time.

5. The vehicle of claim 3, wherein said electronic sensor further comprises a micro-processor and an algorithm for determining whether the movement over time of said sensing mass as processed by said algorithm results in a calculated value which is in excess of the threshold value based on said signal.

6. The vehicle of claim 1, wherein said crash sensor further comprises an accelerometer, said sensing mass constituting part of said accelerometer.

7. The vehicle of claim 6, wherein said crash sensor further comprises a micro-processor for determining whether the movement of said sensing mass over time results in an algorithmic determined value which is in excess of the threshold value based on said signal.

9. The vehicle of claim 6, wherein said inflator means comprise a primer arranged in said inflator housing, said crash sensor including an electronic circuit including said accelerometer and said primer such that upon movement over time of said sensing mass resulting in a calculated value in excess of the threshold value, the electronic circuit is completed thereby causing ignition of said primer.

10. The vehicle of claim 1, wherein said system housing comprises a mounting plate having a bottom wall and flanged side walls, said bottom wall having an aperture, said inflator housing being arranged in said aperture.

11. The vehicle of claim 1, wherein said sensor housing is mounted directly to said inflator housing.

12. The vehicle of claim 1, wherein the first side of the vehicle has a door and said system housing is arranged inside said door.

13. The vehicle of claim 1, wherein a portion of the first side of the vehicle has inner and outer panels fixed in position relative to the frame, said system housing being arranged between said inner and outer panels.

14. The vehicle of claim 1, further comprising a capacitor arranged within said system housing to supply power to initiate deployment of said airbag system.

16. An airbag safety restraint system for a vehicle comprising:
an inflatable airbag having an interior,

an inflator assembly having an inflator housing, an ignitable gas generating material contained in said inflator housing and at least one passage extending between said gas generating material and said interior of said airbag such that upon ignition of said gas generating material, gas is generated and flows through said at least one passage into said interior of said airbag to inflate said airbag, and

an electronic crash sensor for causing ignition of said gas generating material upon a determination of a crash requiring inflation of said airbag,

said crash sensor comprising

a sensor housing situated exterior of said inflator housing,

a sensing mass arranged in said sensor housing to move relative to said sensor housing in response to accelerations of said sensor housing resulting from the crash, a signal representative of the movement of said sensing mass being generated, and

a micro-processor comprising an algorithm for determining whether the movement of said sensing mass over time results in a calculated value which is in excess of a threshold value based on the signal such that if the movement over time of said sensing mass results in a calculated value which is in excess of the threshold value, said micro-processor causes ignition of gas generating material and thus inflation of said airbag.

17. The system of claim 16, wherein said sensor housing is mounted proximate to said inflator housing.

18. The system of claim 16, wherein said crash sensor further comprises an accelerometer, said sensing mass constituting part of said accelerometer.

19. The system of claim 18, wherein the sensing mass is a micro-machined element .

21. The system of claim 18, wherein said inflator assembly further comprises a primer arranged in said inflator housing for igniting said gas generating material, said crash sensor including an electronic circuit including said accelerometer and said primer such that upon movement of said sensing mass over time resulting in a calculated value in excess of the threshold value, the electronic circuit is completed thereby causing ignition of said primer.

22. An airbag safety restraint system for a vehicle comprising:

an inflatable airbag having an interior,

an inflator assembly having an inflator housing, an ignitable gas generating material contained in said inflator housing and at least one passage extending between said gas generating material and said interior of said airbag such that upon ignition of said gas generating material, gas is generated and flows through said at least one passage into said interior of said airbag to inflate said airbag, and

an electronic crash sensor for causing ignition of said gas generating material upon a determination of a crash requiring inflation of said airbag,

said crash sensor comprising

a sensor housing situated exterior of said inflator housing, and

an accelerometer arranged in said sensor housing and including a sensing mass movable relative to said sensor housing in response to accelerations of said sensor housing resulting from the crash, said accelerometer being arranged to generate a signal representative of the movement of said sensing mass over time, said crash sensor being arranged to cause ignition of said gas generating material if the movement over time of said sensing mass represented by said signal results in a calculated value which is in excess of a threshold value.

23. The system of claim 22, wherein said sensor housing is mounted proximate to said inflator housing.

24. The system of claim 22, wherein said sensing mass is a micro-machined element.

26. The system of claim 22, wherein said inflator assembly further comprises a primer arranged in said inflator housing for igniting said gas generating material, said crash sensor including an electronic circuit including said accelerometer and said primer such that upon movement over time of said sensing mass results in a calculated value in excess of the threshold value, the electronic circuit is completed thereby causing ignition of said primer.

27. The system of claim 22, wherein said crash sensor further comprises a micro-processor for determining whether the movement over time of said sensing mass results in a calculated value which is in excess of the threshold value based on said signal.

28. A vehicle including a side impact airbag system, front wheels, rear wheels and a frame defining a front of the vehicle, a rear of the vehicle and first and second sides of the vehicle, said airbag system comprising:

a system housing arranged on the first side of the vehicle alongside at least a portion of a passenger compartment of the vehicle, said system housing defining an interior space,

at least one inflatable airbag arranged in said interior space of said system housing such that when inflating, said at least one airbag is expelled from said system housing into the passenger compartment,

inflator means arranged at least partially within said interior space of said system housing for inflating said at least one airbag, said inflator means comprising an inflator housing containing propellant, and

a crash sensor for initiating inflation of said at least one airbag via said inflator means upon a determination of a crash requiring inflation of said at least one airbag,

said crash sensor comprising

a sensor housing arranged proximate to said inflator housing, and

a sensing mass arranged in said sensor housing to move relative to said sensor housing in response to accelerations of said sensor housing resulting from the crash into the first side of the vehicle such that upon movement of said sensing mass in excess of a threshold value, said crash sensor initiates said inflator means to inflate said at least one airbag.

29. The vehicle of claim 28 wherein the threshold value is a maximum motion of said sensing mass required to determine that a crash requiring deployment of said at least one airbag is taking place.

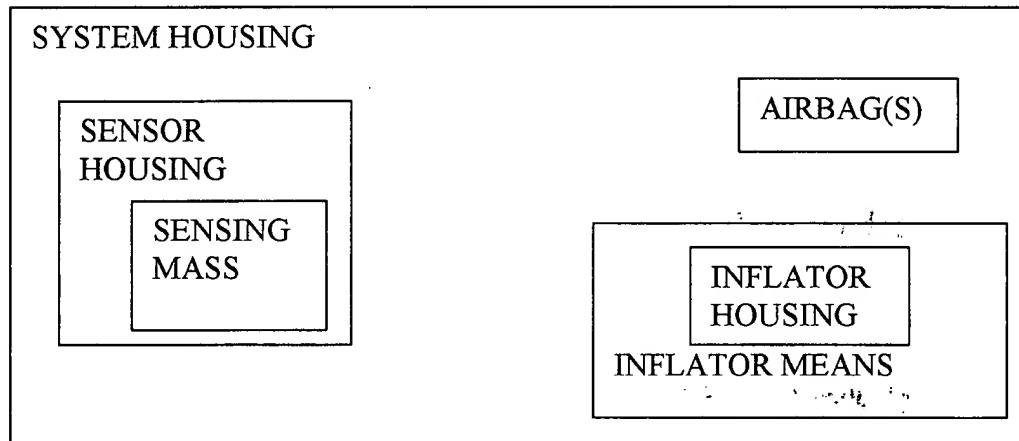
30. The vehicle of claim 3, wherein said generating means comprise at least one piezoelectric element.

31. The vehicle of claim 1, wherein said sensor housing is exterior of said inflator housing.

APPENDIX 2

FIG. 1

(Sensor Housing Within Inflator Housing)





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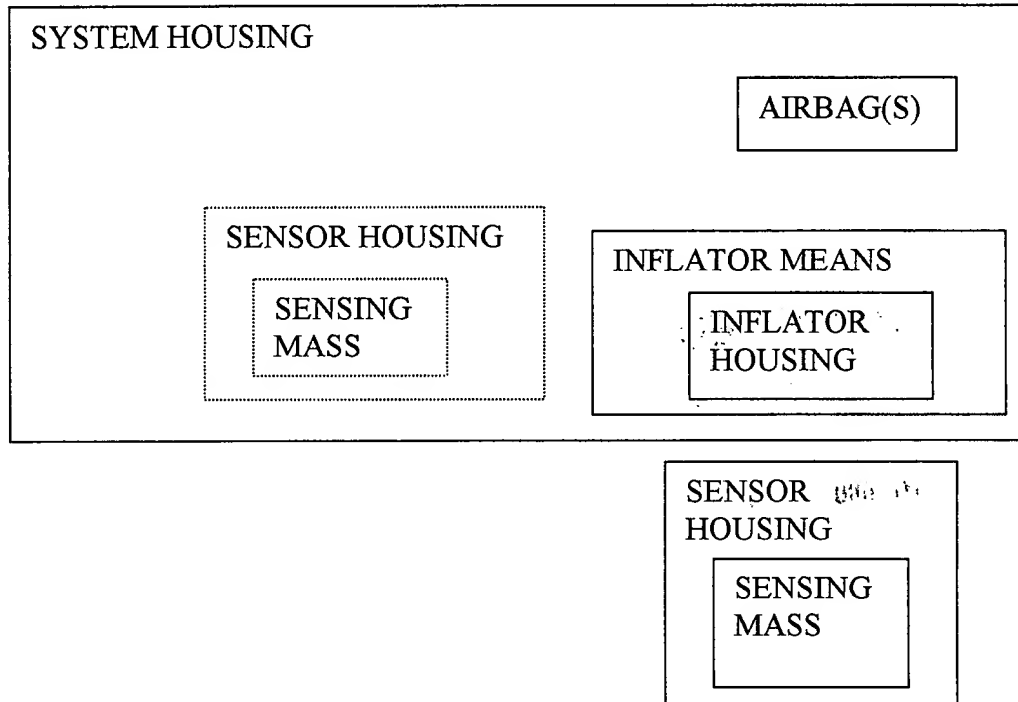
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DO 3600 MAIL ROOM

APPENDIX 2

FIG. 2

(Sensor Housing Proximate (and Within (Dotted lines) or Outside of (Solid lines))
Inflator Housing)





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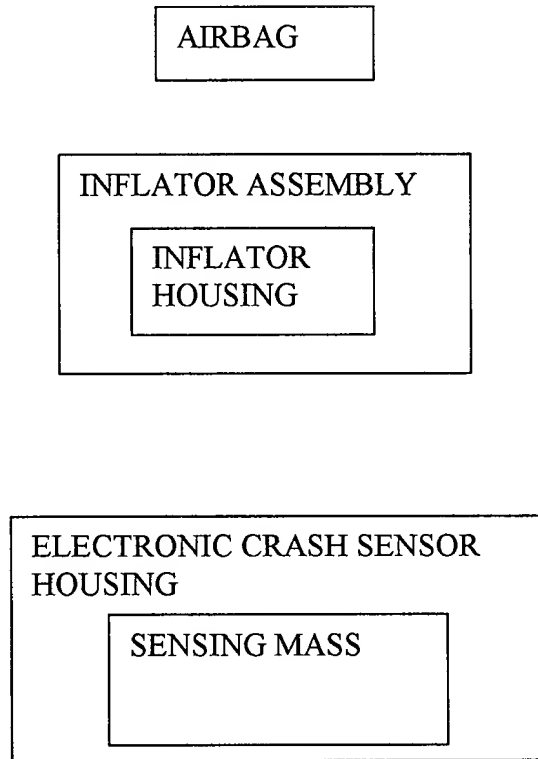
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TO 3600 MAIL ROOM

APPENDIX 2

FIG. 3

(Sensor Housing Outside of Inflator Housing)





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